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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/722,929	11/26/2003	Joseph P. Rynd	25226A	1182

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EXAMINER	
WOLLSCHLAGER, JEFFREY MICHAEL	
ART UNIT	PAPER NUMBER
1742	
MAIL DATE	DELIVERY MODE
11/04/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/722,929	RYND ET AL.	
	Examiner	Art Unit	
	JEFFREY WOLLSCHLAGER	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 September 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8,10-15,27,29-32 and 34-41* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8, 10-15, 27, 29-32, and 34-41* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

Applicant's amendment to the claims filed September 3, 2010 has been entered. Claims 1-5, 7, 10-13, 27, 29, 30 are currently amended. Claims 37-41 are new. Claims 9, 16-26, 28 and 33 have been canceled. Claims 1-8, 10-15, 27, 29-32, and 34-41 are pending and under examination.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-8, 10-15, 27, 29-32, and 34-41 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 1 recites a method "consisting essentially of". In the prosecution history of the instant application and in accord with the generally understood meaning of the phrase (e.g. MPEP 2111.03), the transitional phrase has been understood to exclude the use of "conventional nucleation agents". However, in view of the current amendment, with the presentation of new claim 38, conventional nucleation agents are now presented as being within the scope of claim 1. This raises a substantial question as to the metes and bounds of the scope of the claims. In the September 5, 2008 REMARKS, applicant's attorney appeared to make clear that "conventional nucleation agents", such as talc, where to be considered excluded by the introduction of the transitional phrase "consisting essentially of" (page 12 of the REMARKS, second full paragraph, - page 13 of the REMARKS, first paragraph). The current amendment suggests a possible change in position. The examiner submits that should it be applicant's intent to present a claim with a scope that does

not exclude conventional nucleation agents, the claim would need to be amended to replace the phrase "consisting essentially of" with “comprising”. Alternatively, new claim 38 should be canceled with appropriate clarification. Presently however, the scope of the claims is irresolvable in that the examiner is unable to reconcile the mutually exclusive nature of the positions.

Further, claims 1 and 27 now recite the polymer melt is limited, by the closed language "consist"/”consisting”, to at least one alkenyl aromatic and optionally one or more non-alkenyl aromatic polymers. However, claim 12 recites the polymer includes polyethylene or polymethyl methacrylate. As such, the metes and bounds of the scope of the claimed polymer melt material is also brought in to question since polyethylene, for example, is not an aromatic polymer. Appropriate correction and clarification is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 27, 29-32, 34-36 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (US 6,759,446) in view of Fukushima et al. (Graphite Nanoplatelets as Multifunctional Reinforcements of Polymer Composites, IDS document).

Regarding claims 27-36 and 41, Lee et al. teach the basic claimed process of producing a foam product comprising incorporating a nanocomposite, such as a nanoclay, into a polystyrene (col. 2, lines 25-65); incorporating a blowing agent under a first pressure and temperature and extruding the melt under a second pressure and temperature to produce a foam having a cell size of les than about 20 microns (col. 5, lines 54-col. 6, line 31; col. 3, lines 30-35). Lee et al. teach the foam can be closed cell (col. 3, lines 42-45). Lee et al. do not teach employment of nano-graphite as claimed. However, Fukushima et al. teach a method wherein graphite nanoplatelets are employed as a replacement of nanoclays (Abstract; Introduction; table 1) at values of 0-20% by volume (Figure 3A and 3B). It is noted that 0-20% by volume creates a substantially overlapping range with 0.01 -10% by weight.

Therefore it would have been *prima facie* obvious to one having ordinary skill in the art at the time of the claimed invention to have modified the method of Lee and to have employed nano-graphite, as suggested by Fukushima et al. for the purpose of realizing desired product properties and while employing a material that is disclosed by Fukushima et al. as being suited for “the same nanoreinforcement concept” (Introduction). Further, it is noted that while Fukushima et al. do not explicitly recite that the nano-graphite material is a “nucleating agent”, the combination suggests employment of the same claimed materials in the same claimed manner.

Claims 1-8, 10-15, 27, 29-32 and 34-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chaudhary et al. (US 6,355,341) in view of any one of Fukushima et al.

(Graphite Nanoplatelets as Multifunctional Reinforcements of Polymer Composites, IDS document) or Chen et al. (Dispersion of Nanosheets in a Polymer Matrix and the Conducting Property of the Nanocomposites, IDS document) or Jang et al. (US 7,071,258) or Glicksman et al. (US 5,010,112).

Regarding claims 1-8, 10-15 and 27-36, Chaudhary et al. teach the basic claimed process of producing a closed cell foam comprising blending molten polystyrene and a blowing agent and extruding the mixture through a die to form the foam product (Abstract; col. 1, lines 16-45; col. 2, lines 59-col. 3, line 30; col. 9, lines 27-col. 10, line 46) Additionally, the foam employs various fillers and also suggests additives such as graphite (col. 2, lines 11-14; col. 3, line 24; col. 13, lines 10-18; claim 2 and claim 4) Chaudhary et al. to not disclose the particle size of the employed graphite. However, Fukushima et al. teach a method wherein graphite nanoplatelets are employed as a filler (Abstract; Introduction; table 1) at values of 0-20% by volume (Figure 3A and 3B); Chen et al. teach that graphite in the form of a nanosheet is effective for improving the mechanical properties of the polymer matrix (Abstract; Introduction; Experimental; Mechanical Properties); Jang et al. teach that graphite in the form of nano-scaled plates is 3suited for utilization in polymeric matrix materials (Abstract; Figure 1; col. 8, lines 10-17) and Glicksman et al. teach flakes coated with a thin layer/sheet of graphite having a thickness of one or more orders of magnitude less than a micron is effective at improving the properties of a foam material (Abstract; col. 2, lines 10-62).

Further, it is noted that the claims do not exclude all other nucleating materials besides the claimed graphites as long as the graphites are the only “nano” nucleating agents. It is also noted that while the secondary references do not explicitly recite that the nano-graphite material is a “nucleating agent”, the combination suggests employment of the same claimed materials in the same claimed manner.

Therefore it would have been *prima facie* obvious to one having ordinary skill in the art at the time of the claimed invention to have combined the teaching of Chaudhary et al. with any one of Fukushima et al, or Chen et al., or Jang et al. or Glicksman et al. and to have utilized the graphite material of any one of Fukushima et al, or Chen et al., or Jang et al. or Glicksman et al. for the purpose of utilizing art recognized graphite materials known to be suited for use in a polymeric matrices in order to reinforce and improve the properties of the final product.

Response to Arguments

Applicant's arguments filed September 3, 2010 have been fully considered. Applicant's arguments regarding the rejection based upon Shmidt have been fully considered, but are moot in view of the claim amendment. Applicant's other arguments have been considered, but they are not persuasive. Regarding the rejection of claim 27, Applicant argues that Lee et al. do not teach the "incorporating" and "extruding" limitations of the claim. This argument is not persuasive. The examiner submits initially that the claims are open to a reasonable interpretation and understands the arguments to implicitly require more than is articulated in the language of the claims themselves. Said differently and as explained below, it is the examiner's position that the Lee et al. reference appears to clearly meet the argued limitations. 1) Lee et al. teach that CO2 is injected into the barrel of the extruder and is mixed with the polystyrene melt by screw rotation (col. 6, lines 20-26). This teaching meets the "incorporating" limitation in the claims. The injection of the CO2 happens under what is reasonably considered "a first pressure" and "a first temperature" (i.e. the terms barely limit the claim at all). 2) Next, Lee et al. teach that the material is extruded through the argued die/nozzle and that the quick and large pressure drop through the die/nozzle causes the material to foam/expand and form a foam product (col. 6, lines 15-17; col. 6, lines 26-30). This teaching meets the "extruding" limitation.

The extruding through the nozzle/die happens under what is reasonably considered “a second pressure” and “a second temperature”. As such, the examiner submits Lee et al. clearly meet the argued limitations, and presumes the arguments are reading certain limitations into the claims that are not present in the language of the claim itself. If it is still applicant's position that Lee et al. do not meet the argued limitations, as claimed under a reasonable interpretation, the examiner suggests a very specific argument as to what Lee et al. is supposedly missing should be presented; because, as currently submitted and understood, the teaching of Lee et al. appears highly applicable to the argued limitations.

Applicant further argues that Chaudhary is excluded in view of the amendment directed to the amended polymer melt and the inclusion of an interpolymer in Chaudhary. This argument is not persuasive. The interpolymer of Chaudhary, which comprises as little as 0.3 percent of the composition, contains in one embodiment an aromatic monomer (col. 3, lines 1-9) and ethylene or other alpha olefin for polymerization with the aromatic monomer (col. 3, lines 15-18). This disclosure in Chaudhary appears to be within the scope of claim 2 which claims that ethylenically unsaturated comonomers may still be employed in copolymerization with the aromatic compounds. The examiner submits the claims would need to be amended to overcome the rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JEFFREY WOLLSCHLAGER whose telephone number is (571)272-8937. The examiner can normally be reached on Monday - Thursday 6:45 - 4:15, alternating Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on 571-272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jeff Wollschlager/
Primary Examiner
Art Unit 1742

November 3, 2010